

APPENDIX G

TOW TRAINING TIPS

Experiences at the National Training Center have produced many useful tips for training and employing TOWS. Following these tips will greatly enhance the performance of TOW units in the field.

1. To reduce the effects of heat scintillation, fire from a higher to a lower elevation whenever possible.
2. Train crewmen to remove the protective covers from the electrical connectors of missiles before loading. This is the most common cause of misfires during live fire.
3. Emphasize the obstacle effects of TOW guidance wires. Wire will impede or stop vehicular and dismounted movement. Plan for their recovery and or destruction. Wire cutters are not fine enough to cut TOW wire. The wire must be cut with low-intensity flame when possible.
4. Perform a system self-test and collimate the nightsight to the daysight tracker every 4 hours; after every 10-degree change in temperature; and after moving cross country.
5. Select flat, level firing positions to improve hit probability.
6. Practice fire control and fire patterns at every opportunity.
7. Identify maximum engagement lines and TRPs as accurately as possible. Use adjacent tanks or FO/FIST laser range finders when available.
8. Perform the 180-day verification checks as often as possible (every 30 days is not too often). Verify in the assembly area immediately before combat or live-fire operations. Allow time to fix deficiencies.
9. Increase the amount of time spent tracking in MOPP4. Tracking in MOPP4 improves tracking skills even under MOPP1 conditions.
10. Ensure TOW live fire is conducted from the narrow field of view only.
11. Ensure ITVs, M966s, and BFVs with TOW 2 weapon systems receive priority issue of TOW 2 missiles.
12. Collimate nightsight to daysight each time the system is boresighted.
13. Know the diopter setting. This information should be posted on the system for ready reference.
14. M966 TOW HMMWV:
 - a. Shield the nightsight and daysight from direct sunlight. Cool the nightsight as much as possible to reduce system cool-down time.
 - b. Familiarize gunners with launch obscuration effects:

(1) White out — 1.5 seconds after trigger pull, block daysight for 2 to 5 seconds.

(2) Red out — 1.5 seconds after trigger pull, pass a lit cigarette lighter or other IR heat source 6 inches in front of the AN/TAS-4.

c. Remove AN/TAS-4 eyepiece when tracking in a protective mask. Replace with a doughnut-shaped foam cushion made from a sleeping mat or from ammunition packing and taped to AN/TAS-4.

d. Reinforce counter-rotation launch technique to reduce launch tube climb during live fire.

e. Train gunners to bring cross hairs back on target slowly, avoiding jerky movements.

f. Minimize movement of crew members on vehicle when missile is in flight.

g. Minimize blowing of sand and dust from missile launch, by placing a tarp on the ground in front of the launch tube or by wetting the ground down. Blowing dust and sand can cause the weapon system to lose the IR beacon on the missile.

15. ITV:

a. Ensure the squad leader's periscope and turret bezel ring give the same azimuth reading to within + or -3 degrees.

b. Align the 3X target acquisition sight to the daysight tracker. If they do not align, the ITA has slipped out of tolerance. Report to DS maintenance.

c. Protect the middle of the ITA from wind and sand by fabricating a curtain out of cloth or plastic.

d. Report to DS maintenance if the turret does not traverse smoothly or drifts out of position when stationary.

e. Remove the safety switch from the combat override switch in the assembly area only. Keep the switch cover down when not in use.

f. Use the squad leader's periscope when setting aiming stakes.

g. Ensure the squad leader and gunner practice coordinating with one another when locating and identifying targets.

h. Conserve nightsight batteries through the use of binoculars and other night observation devices.

i. Keep all optics covered when not in use.

j. Open the nightsight, collimator, and BPC cases periodically to reduce heat and provide ventilation.

k. Perform field-expedient collimation by picking a fixed point with IR signature 1,500 to 2,000 meters away. Put the daysight cross hairs on the target, lock down the system, acquire the target with the nightsight, and adjust the nightsight cross hairs to the target.

16. Fire Commands/Missile Selection. With the increase in the number of different types of missiles in the TOW inventory, it will sometimes be necessary to tell the gunner what type of missile to engage the target with (see

Appendix F, Table F-2). If a missile is not loaded in the weapon system, the squad leader can include the missile type in the target description portion of the fire command (SQUAD, T-80, TOW 2B). If a missile is loaded in the weapon system, the squad leader will have to make the decision whether time and the tactical situation make it desirable to unload and then reload the system. If a missile has just been fired, the missile reload type can be designated as part of the cease tracking command (CEASE TRACKING, TARGET DESTROYED, RELOAD WITH TOW 2A).

17. TOW MILES Gunnery. Because TOW MILES is an engagement simulator adapted as an interim gunnery trainer, it is important to return gunners to a precision tracking system before live-fire or combat operations. Because the tracking simulation of TOW MILES is less realistic and more forgiving of errors, hit success with the MILES simulator comes more easily than hit success with the actual TOW missile. This is especially true with panel targets equipped with the LTID. Exclusive training on TOW MILES sometimes lulls gunners into a false sense of tracking proficiency. As an engagement simulator in the role of tactical trainer, TOW MILES offers adequate tactical realism. Good TOW gunners are usually good MILES gunners. The reverse is not necessarily true.

18. TOW Missile Clearance Requirements. If line-of-sight clearance is less than 30 inches, the probability of the missile hitting the ground or an obstruction is increased. Figure G-1 shows the probability of survival for the TOW. The reason for the deviation is that the missile does not precisely follow a gunner's line of sight.

		HEIGHT OF LINE OF SIGHT ABOVE THE GROUND		
		18 INCHES	20 INCHES	30 INCHES
RANGE TO TARGET	200M	.98	.98	1.0
	300M	.95	.96	1.0
	400M	.91	.91	.98
	500M	.86	.91	.98
1,000 to 3,000/3,750M		.56	.61	.93

Figure G-1. Probability of survival for the TOW (meters).

19. TOW Missile Time-Of-Flight Versus Range. Figures G-2 and G-3 show the time of flight of the TOW missile to various ranges. Using these figures allows the squad leader to accurately calculate the time it takes for the missile to reach its target.

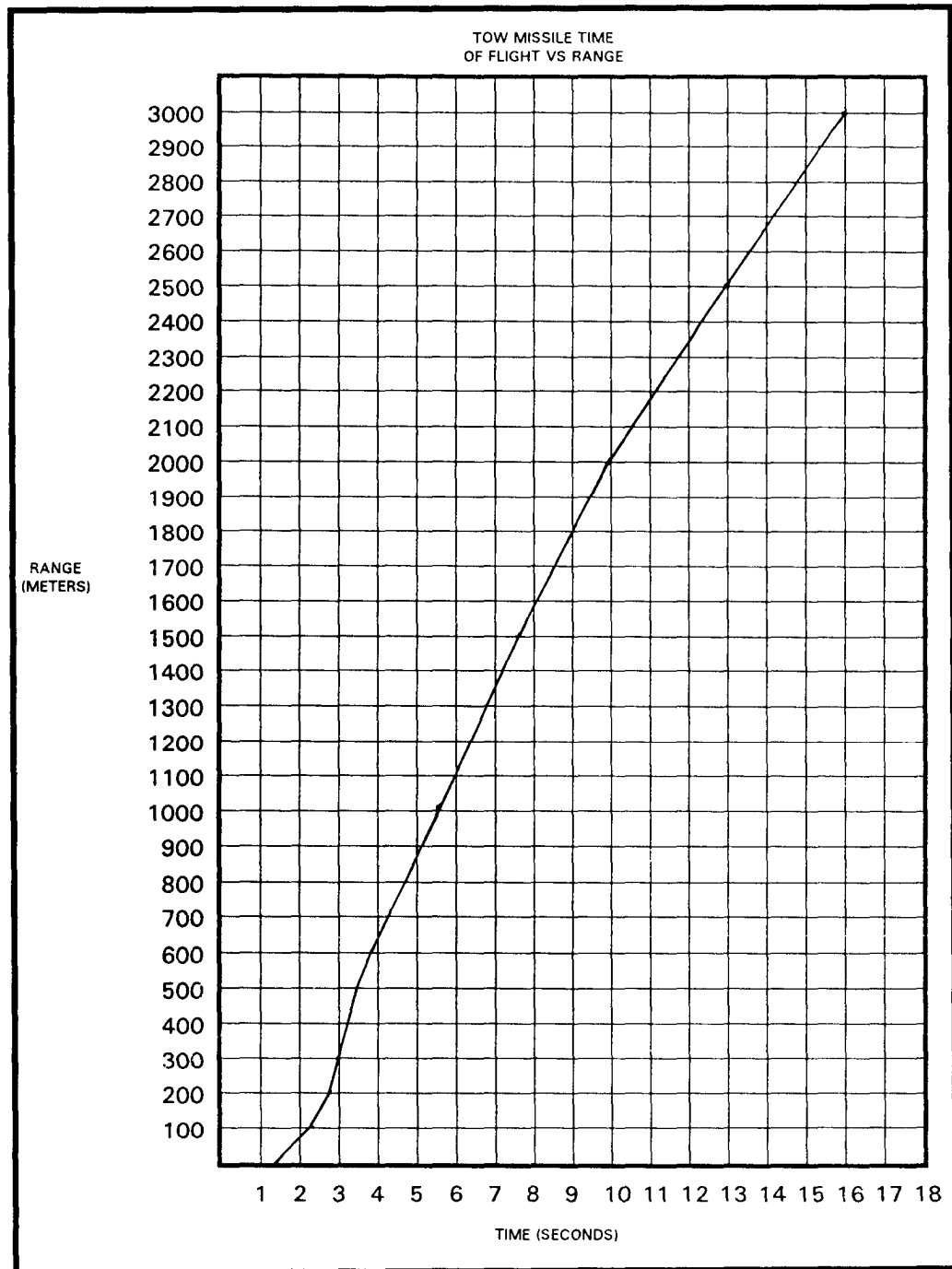


Figure G-2. TOW missile time-of-flight versus range.

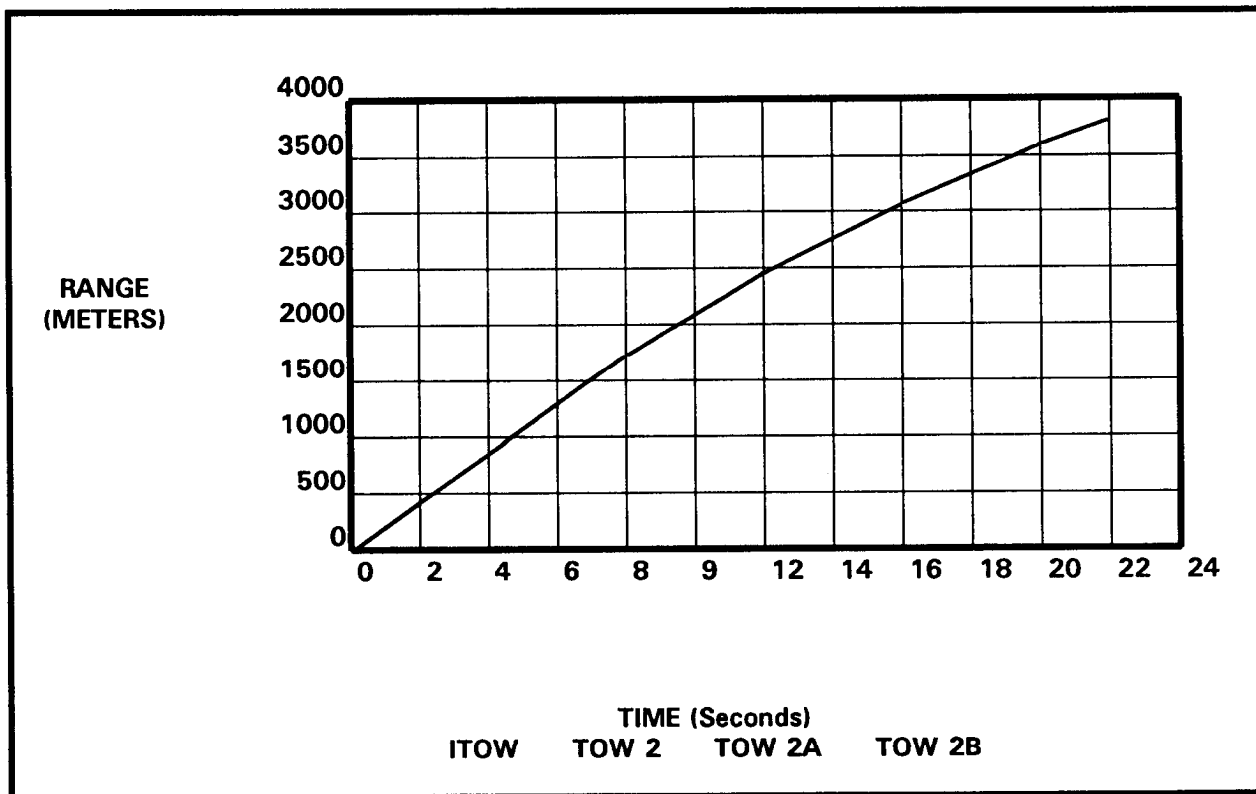


Figure G-3. TOW missile time-of-flight versus range (kilometers).